THURSDAY, OCTOBER 2, 1913.

THEORY AND PRACTICE OF CHEMISTRY.

(1) *Service Chemistry: Being a Short Manual of Chemistry and Metallurgy, and their Application in the Naval and Military Services.* By Prof. V. B. Lewes and J. S. S. Brame. Fourth edition, revised. Pp. xvi+576+vii plates. (London: Edward Arnold, 1913.) Price 15*s.* net.

(2) *Handbuch der Arbeitsmethoden in der anorganischen Chemie.* By Dr. A. Stahler. Erster Band. Pp. xii+786. (Leipzig: Veit and Co., 1913.) Price 25 marks.

(3) *Cours de Chimie Organique.* By Prof. F. Swarts. 2e édition revue et augmentée. Pp. vii+751. (Paris: A. Hermann et Fils; Gand: Ad. Hoste, 1913.) Price 15 francs.

(4) *Allen's Commercial Organic Analysis.* A Treatise on the Properties, Modes of Assaying, and Proximate Analytical Examination of the Various Organic Chemicals and Products Employed in the Arts, Manufactures, Medicine, &c. Volume vii. Fourth edition. Edited by W. A. Davis and S. S. Sadtler. Pp. ix+563. (London: J. and A. Churchill, 1913.) Price 21*s.* net.

(1) TEACHERS of chemistry in colleges of applied science, who nowadays are so frequently requested to arrange specialised courses in this science suitable to the needs of students working chiefly at other subjects, will undoubtedly be interested to learn how this problem has been solved by the authors of this manual, now in its fourth edition, after long experience in the teaching of chemical science to naval officers. The writers very rightly refuse to compile a Service technology without first inculcating a knowledge of the facts and laws governing the results obtained in applied chemistry. At the same time, they carefully select their illustrations so as to arrest immediately the attention of the naval and military student, for whom the work is primarily intended.

Within the first dozen pages the topic of liquefied gases leads to a consideration of the production of "artificial ice and cold storage both on land and sea." The chemistry of galvanic batteries includes a description of Leclanché's cells used in firing torpedoes and submarine mines. The subject of combustion brings in a reference to the spontaneous ignition of coal on shipboard. Special prominence is given to explosives. The evolution of gunpowder is traced, and a concise account is given of the taming of guncotton for use as a propellant. Special sections are devoted to fuel problems, military ballooning, boiler incrustations, corrosion, protective paints, anti-fouling compositions, and many other matters arising out of Service vicissitudes.

From the doctrinal point of view, it would obviate much confusion if the term "atomicity" were employed exclusively to denote the number of atoms in an elementary molecule, and not used as a synonym for "valency." In this connection it may be mentioned that sulphur vapour at 500° C. is stated incorrectly to be hexatomic (p. 322). It is doubtful whether the affinity of the halogens for oxygen decreases regularly from iodine to fluorine. The non-existence of perbromic acid and bromine oxides rather suggests that bromine in this respect falls between chlorine and fluorine (pp. 333, 345). These points, which are open to criticism, are, however, of minor importance, and the work contains so much new material not generally found in chemical text-books that the authors are justified in hoping that the book may appeal to readers outside the circle of Service students.

(2) This work, which is the first of five volumes of a comprehensive text-book on working methods in inorganic chemistry, is a noteworthy example of the "integrated knowledge" now placed at the disposal of chemists called upon to plan the erection and organisation of laboratories for the practice of this important branch of chemical science. The information is characterised throughout by a note of thoroughness, first-hand knowledge being ensured by the author's collaboration with a staff of experts in different branches of practical chemistry. In their efforts to make every item of equipment purposive, the writers take nothing for granted, and discuss in detail such matters as the ample provision of light and space round the laboratory building, the ready accessibility of stairways and exits, the storage in cellars of volatile liquids and liquefied gases, and even the position of bicycle stands! Certain illustrations of various shapes of retort stands and specimen bottles might well be left to the dealers' catalogues.

The varieties of glass suitable for chemical purpose are fully discussed, and it may be noted that the rare alkali metal rubidium has been utilised in the production of a hard glass softening only at 1000° C. Shenstone's pioneering efforts in the production of silica ware are mentioned, and further developments are suggested by references to the use of zirconia and titania in the fabrication of crucibles and refractory apparatus. Considerable improvements have been recently made in the manufacture of porcelain, and vessels

© 1913 Nature Publishing Group

of this material are now obtainable which withstand rapid fluctuations of temperature. The section on the noble metals refers not only to vessels of gold and platinum, but also to apparatus constructed of rhodium, iridium, and tantalum. The chemical and physical properties of the newer alloys (duralumin, the ternary steels, &c.) are reviewed. Scattered through the work are many valuable recipes likely to interest the practical chemist, as, for example, the use of aniline-black as a stain for woodwork, various lutings and cements for joining together chemical apparatus, and a composition for filling holes in platinum crucibles.

Special chapters are devoted to electrical fittings and to the mechanical operations of pulverisation, agitation, filtration, &c. The book affords a striking testimony of the pre-eminence of Germany in the newer industries which minister to the wants of applied chemistry. Some noteworthy products of British enterprise have, however, been overlooked, and mention may be made in this connection of Fletcher's earthenware combustion furnaces and Pilkington's glass screens with an embedded meshwork of invar steel, which form such efficient shields in working with explosive materials.

(3) In this text-book of organic chemistry the author has given prominence to the development of the theory of the subject, descriptive matter being restricted to a few substances of industrial importance. A chapter on chemical kinetics has been added because the fundamental principles of this branch of the science have been chiefly verified in connection with organic substances. From the outset stereochemical considerations are introduced, and the facts of isomerism, multiple linking, and ring formation are regarded from the point of view of the tetrahedral carbon atom. The constitution ascribed to double cyanides (pp. 174, 177) must, however, be regarded as obsolete, in view of Werner's recent researches on coordination compounds. The author omits all references to original memoirs, and the work can scarcely be recommended as a substitute for the larger English treatises on organic chemistry.

(4) This work is the seventh volume of the fourth edition of Allen's well-known treatise on organic analysis. The book is divided into seven sections, each of which is written by an expert on the subject, the entire compilation not only serving as a useful guide to the analyst, but forming also a comprehensive treatise on the general chemistry of the organic materials under review. The present volume is largely devoted to nitrogenous compounds either formed by the vital activities of plants and animals or arising from the decay of these organisms. In recent years considerable addition has been made to our knowledge of these products, among which may be mentioned the alkaloids of ergot, cyanogenetic glucosides, ptomaines, amino-acids, and purine derivatives. One section is devoted to lactic acid, and another to the bitter principles of aloes and hops, whilst the concluding chapter is a useful monograph on cyanogen and its derivatives.

G. T. M.

SOME NEW ELECTRICAL BOOKS.

(1) *Electrical Photometry and Illumination: A Treatise on Light and its Distribution, Photometric Apparatus, and Illuminating Engineering.* By Prof. H. Bohle. Pp. xi+222. (London: C. Griffin and Co., Ltd., 1912.) Price 10*s*. 6*d*. net.

(2) *The Principles of Applied Electrochemistry.* By Dr. A. J. Allmand. Pp. xii+547. (London: Edward Arnold, 1912.) Price 18*s*. net.

(3) *Electroplating: A Treatise on the Electro-Deposition of Metals, with a chapter on Metal-Colouring and Bronzing.* By W. R. Barclay and C. H. Hainsworth. Pp. viii+399. (London: Edward Arnold, 1912.) Price 7*s*. 6*d*. net.

(4) *The Design of Alternating Current Machinery.* By J. R. Barr and R. D. Archibald. Pp. xvi+496+xvi plates. (London: Whittaker and Co., 1913.) Price 12*s*. 6*d* net.

(5) *A Laboratory Manual of Alternating Currents.* By Prof. J. H. Morecroft. Pp. viii+247. (London: Longmans, Green and Co., 1912.) Price 7*s*. 6*d*. net.

(6) *La Télégraphie et la Téléphonie Simultanées et la Téléphonie Multiple.* By K. Berger. Traduit par P. Le Normand. Pp. 134. (Paris: Gauthier-Villars, 1913.) Price 4.50 francs.

(7) *The Baudôt Printing Telegraph System.* By H. W. Pendry. Pp. iii+147+plates. (London: Whittaker and Co., 1913.) Price 2*s*. 6*d*. net.

(1) DURING comparatively recent years there has sprung into existence a new branch of science which is known, or knows itself, as illuminating engineering. The writer has a suspicion that if the electrical engineer who handled lighting problems had not been on the lookout for another stick with which to beat his brother gas engineer, and had not thought that stick was to be found in the greater ease with which scientific measurements can be applied to electric lamps, no such science would ever have sprung into a definite and separate existence. Be that as it may, the profession appears to be establishing itself with some degree of firmness. The illuminating engineer of theory is a man of unbiassed mind as regards the particular illuminant he employs, provided he attains his desired end in the most economical

© 1913 Nature Publishing Group